



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/803,683	03/09/2001	Lawrence J. Revit	12671US02	7009

7590 12/01/2004

McAndrews, Held & Malloy, Ltd
34th Floor
500 West Madison Street
Chicago, IL 60661

EXAMINER

MICHALSKI, JUSTIN I

ART UNIT	PAPER NUMBER
----------	--------------

2644

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/803,683

Applicant(s)

REVIT ET AL.

Examiner

Justin Michalski

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 2 July 2004 have been fully considered but they are not persuasive.

Regarding Claims 1-5, 9, and 13 the applicant argues on page 3, lines 1-5, that Voroba fails to disclose an audio signal processing system for generating processed audio signals and a plurality of loudspeakers for converting the processed audio signals into a combination of sounds producing acoustic elements typical of real acoustic environment. The Office respectfully disagrees with this argument since Voroba clearly discloses in Col. 5, line 54 through Col. 6, line 2 that a plurality of speakers are used so that the natural hearing environment in which the aid is to be used can be recreated.

The applicant further argues, page 3, lines 7-11, that Voroba does not disclose processing audio signals but merely discloses playing pre-recorded sounds. The Office respectfully disagrees with this argument since Voroba clearly discloses in Col 6, line 67 through Col. 7, line 8 that the audio board (69) switches and mixes (i.e. processes) the sound which is connected to power amplifiers for each of the speakers utilized.

Regarding Claim 6-8, the applicant argues page 4, lines 4-13, that Grimani does not disclose an audio signal processing system for generating processed audio signals and a plurality of loudspeakers for converting the processed audio signals into a combination of sounds producing acoustic elements typical of a real acoustic environment. This is not persuasive as Voroba is used to teach this limitation as argued apropos of claim 1 above.

Regarding Claim 10-12, the applicant argues page 5, lines 1-10, that Ida does not disclose an audio signal processing system for generating processed audio signals and a plurality of loudspeakers for converting the processed audio signals into a combination of sounds producing acoustic elements typical of a real acoustic environment. This is not persuasive as Voroba is used to teach this limitation as argued apropos of claim 1 above.

Regarding Claims 14-20, the applicant argues page 6, lines 18-23, that Kasai fails to disclose at least one audio source transmitting a time-offset of the at least a portion of the plurality of audio signals and the further audio signals to the second loudspeaker. The Office respectfully disagrees with this argument since Kasa clearly discloses delay (i.e. time-offset) processing (Fig. 15, 14L and 14R) to loudspeakers L_{out} , R_{out} and SUB_{out} .

The applicant further argues page 7, lines 1-6, that cited reference are not analogous and therefore not combinable. In response to applicant's argument that Shennib and Kasai is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Kasai and Shennib are analogous since which both deal with three-dimensional sound generation. Shennib discloses creating signals that are representative signals received in real listening environments in

Art Unit: 2644

a three-dimensional space (Col. 9, lines 27-41). Kasai discloses an apparatus for localizing a sound image capable of achieving a surround-effect (Col. 2, lines 26-31).

Regarding Claims 21, 22, 24, and 25, the applicant argues page 8, lines 18-23, that Ide does not disclose recorded speech as a target signal and reproduce the stored target signal and additional audio signals representative of speech in an acoustic environment. The Office respectfully disagrees with this argument as Ide clearly discloses in Fig. 3 a digital multi-track recorder (66) which records a plurality of input signals.

The applicant further argues that Voroba does not disclose recording audio signals. This is not persuasive as Ide is used to teach this limitation as stated above. Further, it is inherent in Voroba that signals will be recorded in order for the signals to be played by tape deck 65 and 66.

The applicant further argues that there is no motivation to combine Ide and Voroba. This is not persuasive as Ide discloses a method of creating a vivid and natural three-dimensional sound field (Col. 2, lines 4-11) and Voroba discloses that the patient is preferably situated in a sound field where the natural hearing environments in which the aid is to be used can be recreated (Col. 5, lines 54-58). As stated in the previous rejection, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of recording sounds as disclosed by Ide and the method of testing hearing aids in order to create a vivid and natural three-dimensional sound field in which the hearing aid to be used can be recreated.

Regarding Claim 23, the applicant argues page 10, lines 17-22, that Kasai does not disclose generating sound from at least a portion of the audio signals that appears to, but does not, emanate from at least one other of a plurality of loudspeakers. This is not persuasive as Kasai discloses a method for processing audio signals to produce a surround-effect (i.e. sound image) (Column 2 lines 26-31). Kasai discloses a center channel is added to 4L and 4R in Figure 5 to localize an image at speaker XC in order to produce a surround sound image (Column 6, lines 45-49).

The applicant further argues in paragraph bridging pages 10 and 11, that cited reference are not analogous and therefore not combinable. In response to applicant's argument that Shennib and Kasai is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Kasai and Shennib are analogous since which both deal with three-dimensional sound generation. Shennib discloses creating signals that are representative signals received in real listening environments in a three-dimensional space (Col. 9, lines 27-41). Kasai discloses an apparatus for localizing a sound image capable of achieving a surround-effect (Col. 2, lines 26-31).

The following rejection stands as presented in the previous office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1-5, 9, and 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Voroba et al. (Hereinafter "Voroba") (US Patent 4,759,070).

Regarding Claim 1, Voroba discloses a multi-channel sound reproduction system for testing hearing and hearing aids (Figure 1) comprising: at least one audio source (Figure 5, references 65 and 66); an audio signal processing system for receiving a plurality of audio signals from the audio source and for generating therefrom a plurality or processed audio signals (Figure 5, references 69); a listening position at which a test subject is placed (Figure 1); and a plurality of loudspeakers for receiving at least a portion of the plurality of processed audio signals and for converting those processed audio signals received into a combination of sounds that produce at the listening position acoustic elements typical of a real acoustic environment (Speakers 22).

Regarding Claim 2, Voroba further discloses the plurality of loudspeakers are placed and oriented arbitrarily about the listening position (Figure 1 shows speakers 22 placed arbitrarily about the listening position).

Regarding Claim 3, Voroba further discloses wherein placed and oriented arbitrarily about the listening position comprises a configuration in which the loudspeakers face different directions relative to each other and relative to the listening

Art Unit: 2644

positions (Figure 1 shows speakers 22 facing different directions relative to each other and also relative to the listener facing forward towards console 45).

Regarding Claim 4, Voroba further discloses the multi-channel sound reproducing system of claim 1 wherein one of the plurality of processed audio signal represents a target signal (Figure 5, stimulus 65) and a remainder of the plurality of processed audio signals comprise multiple interfering noise signals (ambience 66).

Regarding Claim 5, Voroba further the device being a hearing aid testing apparatus which allow the user to communicate response of the hearing aid (i.e. audiometric system) (Column 2, lines 48-56).

Regarding Claim 9, Voroba further discloses the plurality of loudspeakers are laced at locations that are approximately equidistant from a center of the listening position (Figure 1, speakers 22), and wherein the plurality of loudspeakers are facing the center of the listening position.

Regarding Claim 13, Voroba further discloses a plurality of audio power amplifiers (Figure 5, amplifiers 71) for receiving the plurality of processed signals (output from level control 69) and for amplifying the plurality of processed audio signals.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voroba as applied to claim 1 above in view of Grimani (US Patent 6,498,852).

Regarding Claim 6, Voroba discloses a system as stated apropos of claim 1 above including using a plurality of speakers arrayed around the patient's head so that the natural hearing environment in which the aid is to be used can be recreated (Column 5, lines 54-58). Voroba does not disclose discrete adjusted versions of the signals or one of the signals comprising a combination of the plurality of audio signals. Grimani discloses a sound processing circuit (Figure 2) creating signals for a plurality of speakers to be situated around a listener for surround sound. Grimani discloses all but one (signal LFE 40) of the plurality of processed audio signals (signals 21-25 and 40) comprises discrete adjusted versions (adjusted by references 1 and 4) of the plurality of audio signal and wherein the one of the plurality of processed audio signals comprises a combination of the plurality of audio signals (signals 40 comprises of signals 11-15 and 30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include circuitry in the system in order to provide a multi channel surround sound system to create the natural hearing environment around a listener.

Regarding Claim 7, Grimani further discloses one of the plurality of loudspeakers comprises a subwoofer (Figure 2 discloses low frequency signal 40 for subwoofer), and wherein the one of the plurality of processed audio signals (low frequency signal 40) is received by the subwoofer.

Regarding claim 8, Grimani further discloses signals (11-15) are supplied to the same summing network 6 providing the same contribution to output 40.

6. Claim 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voroba as applied to claim 9 above in view of Ide et al. (Hereinafter "Ide")(US Patent 5,260,920).

Regarding Claim 10, Voroba discloses a system as stated apropos of claim 9 above including a plurality of speakers and pre-recorded noise and speech to simulate sound environment in which the patient may find themselves (Column 7, lines 15-23). Voroba does not disclose the audio signal are representative of recordings made by a plurality of microphones that are placed at locations relative to a recording position. Ide discloses a system for recording and playing audio to reproduce a more natural and vivid three-dimensional sound field (Column 2, lines 4-11) including a plurality of microphones (Figure 1, microphones 16-23) that are placed at locations relative to a recording position (Figures 1 and 2, position 24) that corresponds to the location of the plurality of loudspeakers relative to the listening position (Figure 2, speakers 46-53), the plurality of microphones during recording facing away from a center of the recording position (Figure 1, discloses microphones 16-23 facing away from position 24), the recording position being located in an environment having sounds desired to be reproduced at the listening position.

Regarding Claim 11, Ide further discloses at least two of the plurality of loudspeakers generate sound that appears to, but does not, emanate from another of

the plurality of loudspeakers. (Ide discloses reproducing a three-dimensional sound field which will inherently include sounds that appear to emanate from another of the plurality of loudspeakers) (Column 2, lines 5-15).

Regarding Claim 12, Voroba further discloses the at least one audio source is calibrated by generating a predetermined sound pressure level (Figure 3, Volume controls 98 and 99) (Column 7, lines 30-35) at a calibration point located at or near the listening position (Figure 1, patients console 45).

7. Claims 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shennib (US Patent 5,825,894) in view of Kasai et al. (Hereinafter "Kasai") (US Patent 6,067,360).

Regarding Claim 14, Shennib discloses a multi-channel sound reproduction system for testing hearing and hearing aids (Figure 5 and 7) comprising: at least one audio source (Figure 1, storage 17); a listening position at which a test subject is placed (Figure 5); a plurality of loudspeakers located at approximately ear level of a test subject in the listening position (Figure 7 speakers 89-92), the plurality of loudspeakers for receiving a plurality of audio signals from the audio source (Figure 1 discloses speakers 16 connected to storage 17); a first further loudspeaker located at approximately ear level and at front and center of a test subject in the listening position (Figure 7 speaker 89), the first further loudspeaker for receiving a further audio signal from the audio source (Figure 1 discloses speakers 16 connected to storage 17); a second further loudspeaker located at an overhead center position above the test subject in the listening position

(Figure 7 discloses speaker 93 located over the head position and center). Although Shennib discloses creating signals that are representative signals received in real listening environments in a three-dimensional space (Column 9, lines 27-41), Shennib does not disclose the at least one audio source transmitting a time-offset or delayed sum of the at least a portion of the plurality of audio signals and the further audio signals to the second further loudspeaker. Kasai discloses a method for processing audio signals to produce a surround-effect (i.e. real listening environment in a three-dimensional space) (Column 2 lines 26-31). Kasai discloses processing comprising of delay processors (Figure 5, references 14L, 14R, and 30) and summers (44, 46, 16, 18, and 54) to provide the surround sound effect of Figure 4. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include processing to delay and sum signals in order to provide a three-dimensional sound space as required by Shennib.

Regarding Claim 15, Kasai further discloses all signals C, F_L, F_R, S_L, S_R being added in adder 54.

Regarding Claim 16, Kasai further discloses in figure 5 the audio source comprises channels C, F_L, F_R, S_L, S_R, and LFE (i.e. a 5.1 channel medium).

Regarding Claim 17, Kasai further discloses signals (C, F_L, F_R, S_L, S_R) for speakers center, front left, front right, surround left, and surround right which correspond to four corners relative to a listening position.

Regarding Claim 18, Kasai further discloses a signal (LFE) for a subwoofer (Figure 4, speaker 4S).

Regarding Claim 19, Kasai further discloses a low-pass filtered sum of a plurality of audio signals to the subwoofer (Figure 5, filter 60).

Regarding Claim 20, Kasai further discloses in Figure 5, signals C, F_L, F_R, SL, S_R, and LFE which all are used to produce the output signals (i.e. signals compete for output).

8. Claims 21, 22, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ide (US Patent 5,260,920) in view of Voroba (US Patent 4,759,070).

Regarding Claim 21, Ide discloses a method comprising: recording sounds of a acoustic environment via a plurality of microphones (Figure 1, microphones 16-23) placed about and facing away from a recording position (position 24); storing the sounds recorded by each of the plurality of microphones as audio signals in an audio source (source position 24); storing recorded signals as a target signal in the audio source (Figure 3); and reproducing, from the stored target signal and the stored audio signals and via a plurality of loudspeakers (Figure 2, speakers 46-53) placed about and facing into a listening position (position 24), sounds representative of the speech and of the acoustic environment at the listening position. Ide does not disclose recording speech. However, it is well known in the art that microphones can be used for recording speech. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method as disclosed by Ide as a way of recording speech. Although Ide discloses a method of creating a vivid and natural three-dimensional sound field (Column 2, lines 4-11), Ide does not disclose it for use in

Art Unit: 2644

testing hearing aids or hearing. Voroba discloses a method of testing hearing and hearing aids using a plurality of speakers situated around a listening position to create a natural hearing environment in which the aid to be used can be recreated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of recording sounds as disclosed by Ide and the method of testing of hearing aids in order to create a vivid and natural three-dimensional sound field in which the hearing aid to be used can be recreated.

Regarding Claim 22, Ide further discloses the method is used to reproduce a more natural and vivid three-dimensional sound field (Column 2, lines 4-11) which would inherently include a target signals and environmental sound signals. In order to reproduce the sound field it is also inherent that the target signals and environmental signals would have to be combined prior to being output through the array of speakers (46-52) in order to produce a three-dimensional sound field.

Regarding Claim 24, Ide discloses a system comprising; at least one audio source (area around position 24); a listening position at which a test subject is placed (Figures 1 and 2, position 24); and a plurality of loudspeakers placed at locations that are approximately equidistant from and facing toward a center of the listening position (Figure 2, speakers 46-53), the plurality of loudspeakers for receiving audio signals from the audio source (Figure 3 discloses speakers 46-53 receiving signals from microphones 16-23), the audio signals being representative of recordings made by a plurality of microphones that are approximately equidistant from and facing away from a center of a recording position (Figure 1, microphones 16-23), the recording position

being located in an environment having sounds desired to be reproduced at the listening position (Figure 2, position 24). Although Ide discloses a method of creating a vivid and natural three-dimensional sound field (Column 2, lines 4-11), Ide does not disclose it for use in testing hearing aids or hearing. Voroba discloses a method of testing hearing and hearing aids using a plurality of speakers situated around a listening position to create a natural hearing environment in which the aid to be used can be recreated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of recording sounds as disclosed by Ide and the method of testing of hearing aids in order to create a vivid and natural three-dimensional sound field in which the hearing aid to be used can be recreated.

Regarding Claim 25, Ida further discloses a distance between each of the plurality of loudspeakers and the center of the listening position is approximately the same as a distance between each of the plurality of microphones and the center of the recording position (Figures 1 and 2).

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Voroba (US Patent 4,759,070) in view of Kasai (US Patent 6,067,360). Voroba discloses a multi channel sound reproduction system for testing hearing and hearing aids comprising: at least one audio source (Figure 5, sources 65 and 66); a listening position at which a test subject is placed (Figure 1); and a plurality of loudspeakers placed about the listening position (Figure 1, speakers 22). Voroba discloses the plurality of speakers are used to recreate a natural hearing environment in which the aids are to be used.

Voroba does not explicitly disclose the signals from two loudspeakers generates a sound that appears to emanate from another loudspeaker. Kasai discloses a method for processing audio signals to produce a surround-effect (i.e. natural hearing environment) (Column 2 lines 26-31). It is known in the art that surround-sound systems can produce sound that appear to emanate from any location. Kasai discloses a center channel is added to 4L and 4R in Figure 5 to localize an image at speaker XC in order to produce a surround sound image (Column 6, lines 45-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow at least two speakers to produce a sound image that appears to emanate from a different location (including another speaker) to produce a surround sound image and a natural hearing environment.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2644

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (703)305-5598. The examiner can normally be reached on 8 Hours, 5 day/week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JIM


Xu Mei
PRIMARY EXAMINER